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09/818,172	03/27/2001	Eliot M. Case	1814 (USW 0617 PUS)	2380
22193	7590	06/15/2004	EXAMINER	
QWEST COMMUNICATIONS INTERNATIONAL INC LAW DEPT INTELLECTUAL PROPERTY GROUP 1801 CALIFORNIA STREET, SUITE 3800 DENVER, CO 80202			BRANT, DMITRY	
			ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/818,172

**Applicant(s)**

CASE, ELIOT M.

**Examiner**

Dmitry Brant

**Art Unit**

2655

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 3/29/04.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-11 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments have been fully considered but they are not persuasive.

As per claim 1, Applicant argues that Page fails to describe or suggest "training of digital voice library to associated syllable item with a literal text syllable of the particular speech item," which must be necessarily incorporated in Page under principles of inherency. (Amendment, p. 3) However, Applicant acknowledges that "diphone dictionary in Page needs to be trained." (Amendment, p. 3) Therefore, by the Applicant's own admission, Page inherently requires training of the voice library (dictionary). Applicant further claims that it is not inherent that the training of the library occurs as recited in claim 1. However, claim 1 merely recites *associating syllable item with a literal text syllable of the particular speech item*. Since any text-to-speech library training would create some mapping between syllable items (diphones, etc) and text required for output, claim 1 does not recite any specific limitations that would make this claim patentable. While the Applicant's response does not explicitly specify the "claimed technique" which would make this claim patentable, it is noted that the features which Applicant infers are not recited in the rejected claim. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

As per claims 5-11, Applicant argues that the added references do not overcome deficiencies of Page. However, in light of explanation of inherency in the previous paragraph, Applicant's arguments on this ground are moot.

Furthermore, in response to Applicant's arguments that there is no suggestion to combine the references for claims 5-11, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation is in knowledge generally available to one of ordinary skill in the art, as stated later (also in rejection).

As per claim 5, training dictionaries using neural networks is a well-known technique in the art of speech processing. Karalli et al. discloses a Text-To-Speech (TTS) system similar to the one taught by Page. As discussed in rejection of claim 1, Page's TTS system would necessarily require training and as a result, Karalli's method of training a TTS system would be an efficient solution to the training problem. For example, Karalli provides the following efficiency motivation for using neural networks for training TTS systems at Col. 1, lines 45-47: "Neural networks overcome large storage requirements of concatenative and synthesis-by rule systems, since the knowledge base is stored in the weights rather than in memory."

As per claim 6, the Examiner has incorporated a reference into the body of rejection (instead of official notice)

As per claims 7-10, Applicant does not specify the reasons for his belief in the lack of motivation to combine Page and Lin et al. As it stands, there is sufficient motivation in the knowledge generally available to one of ordinary skill in the art to combine Page and Lin et al. Page discloses synthesis of the unknown portion of the message (B, FIG. 2) and as a result, would necessarily require parsing of the textual representation of the unknown word into a sequence of syllables (see breakdown of word "Three" in B, FIG. 2). While Page does not explicitly disclose the specifics of the unknown word parsing, his system would require some efficient method of parsing such words. The system of Lin et al. discloses exactly such techniques, and as a result, would have been an obvious choice for supplementing Page's system for one skilled in the art to allow the system to synthesize speech without having to store all the words in advance. This would increase flexibility and storage requirements for the system, as it would not have to pre-store all the words (less storage) and could handle arbitrary words and acronyms (flexibility).

As per claim 11, Applicant does not specify the reasons for his belief in the lack of motivation to combine Page and Carter et al. However, the motivation can be the knowledge generally available to one of ordinary skill in the art. Here, the concept of "caching" data to speed up future references is notoriously well-known in the art to

improve the performance of the system by storing the frequently used data in the faster memory or pre-parsed data structures (such as digital library), thus minimizing the search times and I/O delays for database access. Therefore, it would have been obvious for one skilled in the art to combine Page and Carter et al. to improve the efficiency of the system in situations where same words often re-appear in the input and, as a result, avoid duplicate processing of unknown words each time these words are encountered.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the Applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the Applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-4 are rejected under 35 U.S.C. 102(e) as being anticipated by Page et al. (6,175,821). The table below summarizes limitations of this applications and parts of Page et al. that “read on” these limitations.

Claim#	Limitations	Page et al.
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1	<p>A method for converting text to concatenated voice by utilizing a digital voice library and a set of playback rules, the digital voice library including a plurality of speech items including words and syllables and a corresponding plurality of voice recordings wherein each speech item corresponds to at least one available voice recording, the method comprising:</p> <p>training the digital voice library to associate each syllable speech item with a literal text syllable of the particular syllable speech item.</p>	<p>The system contains ROM (<b>3, FIG. 1</b>) that stores recordings of phrase used for messages outputs. In addition, speech converter (<b>4, FIG. 1</b>) has a diphone dictionary for converting text to speech.</p> <p>Inherently, for speech synthesis, this dictionary has to be trained (or initially populated) in order to create a mapping between text syllables and dyphones.</p>
2	<p>The method of claim 1 further comprising:</p> <p>receiving a sequence of words including known words that correspond to word speech items in the digital voice library and including unknown words</p> <p>converting each known word into a word speech item in accordance with the digital voice library</p> <p>and for each unknown word, parsing the unknown word to determine a sequence of literal text syllables and converting the text syllable sequence to a sequence of syllable speech items in accordance with the digital voice library.</p>	<p>The system receives a text message (<b>Col. 4, lines 60-63</b>), then synthesizes the message using diphone dictionary of speech synthesizer (<b>Col. 4, lines 63-66</b>). In addition, invariable (known) portions of the text message are converted directly to preset recordings by message generator (<b>Col. 5, lines 42-45</b>)</p>
3	<p>The method of claim 2 further comprising:</p> <p>converting the sequence of word speech items and syllable speech items into a sequence of voice recordings in accordance with the set of playback rules.</p>	<p>The variable and invariable portions are pre-processed in order to produce natural-sounding message (<b>Col. 5, lines 36-45</b>)</p>
4	<p>The method of claim 3 further comprising:</p> <p>generating voice data based on the sequence of voice recordings by concatenating adjacent recordings in the sequence of voice recordings.</p>	<p>The variable and invariable portions of the message are concatenated together into a unified recording by message generator (<b>Col. 5, 45-49</b>)</p>

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being obvious over Page et al. in view of Karalli et al. (5,668,926).

As per claim 5, Page et al. discloses a speech converter that has a diphone dictionary for converting text to speech (4, FIG. 1).

Page et al. do not disclose training the dictionary by "utilizing a neural network having an input and an output to train the digital voice library with the neural network receiving the literal text syllable of the particular syllable speech item as input and with the neural network outputting the associated syllable speech item."

Karalli et al. teach the use of neural networks to train the text-to-speech system (Col. 2, lines 21-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Page et al. as taught in Karalli et al., in order to populate the diphone dictionary in the efficient manner and also provide an effective method of resolving ambiguous inputs to the dictionary.



6. Claim 6 is rejected under 35 U.S.C. 103(a) as being obvious over Page et al. in view of Walker (6,510,413)

Page et al. do not disclose training the digital library by “manually associating each syllable speech item with the literal text syllable of the particular syllable speech item.”

The process of manually populating any look-up table (or dictionary) is similar to the process of inserting the words in a foreign dictionary (For example, English-Spanish). In that case, an editor/writer manually creates a mapping between each English word and its Spanish translation. Alternatively, similar mappings are using in computer arts. For example, “hosts” file on Windows operating system allows the user to manually enter the mappings between the IP addresses and host names. Other examples in the computer arts abound (such as address books). Therefore, manually adding entries to tables/dictionaries of various information is by no means an original concept and is well-known in many arts, including computer hardware and software.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Page et al. to manually associate each literal text syllable with the corresponding syllable speech item since this would be the most straightforward and “brute force” method of training the dictionary.

7. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being obvious over Page et al. in view of Lin et al. (6,076,060)

As per claim 7, Page et al. discloses a speech converter that has a diphone dictionary for converting text to speech (4, FIG. 1).

Page et al. do not disclose "parsing the unknown word to determine a sequence of literal text syllables and known words, and converting the sequence to a sequence of syllable speech items and word speech items in accordance with the digital voice library. "

Lin et al. teach parsing the unknown word into a sequence of syllables and word speech items (Col. 6, line 56-60) that are later converted to speech sounds (16, FIG. 2)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Page et al. as taught in Lin et al., in order to eventually create a dyphone representation of each unknown word so it could be synthesized by speech synthesizer that requires an input of dyphones to produce the output sound.

As per claim 8, Page et al. do not disclose parsing that comprises:

- parsing the unknown word in the forward direction to determine any known words
- parsing the unknown word in the reverse direction to determine any known words where any known words overlap, selecting the larger word
- parsing the unknown word in the forward direction to determine any literal text syllables
- parsing the unknown word in the reverse direction to determine any literal text syllables.

Lin et al. teach parsing the words in from left-to-right and from right-to-left in order to determine sub-words and literal text symbols (Col. 3, lines 45-53). Also, the large words are chosen first (Col. 3, lines 55-58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Page et al. as taught in Lin et al., in order to create an efficient parsing technique that more closely matches the way words are parsed when spoken by humans. This method of parsing is less likely to miss important sub-stings in unknown words.

As per claim 9 and 10, Page et al. discloses the calculation and adjustment of pitch of the generated message using transition signals and appropriate voice recordings (Col. 2, lines 32-48)

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being obvious over Page et al. in view of Carter et al. (6,600,814)

Page does not disclose "for each unknown word, after the unknown word is parsed, storing results of the parsing in the digital voice library so that a next encounter with the same unknown word may be handled more efficiently."

Carter et al. teaches storing processed portions of text in the text-to-speech system to alleviate the load on the system (Col 2, lines 30-39).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Page et al. as taught by Carter et al. to store the parsed results of unknown words so that next attempts with the same words were handled more efficiently. This concept of "caching" data for future reference is extremely well-known and widely used in the art of computing.

***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dmitry Brant whose telephone number is (703) 305-8954. The examiner can normally be reached on Mon. - Fri. (8:30am - 5pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Talivaldis Ivars Smits can be reached on (703) 306-3011. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to Tech Center 2600 receptionist whose telephone number is (703) 305- 4700.

*Nguyen Vb*  
6-14-04

DB  
6/3/04

NGUYENT.VO  
PRIMARY EXAMINER